

IN THE CLAIMS:

Please cancel claims 2 to 18, 33, 34, 36, 37, 39 to 53, 55 to 69 to 73, 76 to 81, 83 to 94, and 96 to 119 without prejudice or disclaimer of subject matter.

Please amend the remaining claims, as follows:

1. (Previously Presented) A multi-beam scanning optical apparatus comprising:
  - incident optical means for making a plurality of light beams emitted from light source means having a plurality of light emitting portions incident on deflection means; and
  - scanning optical means for forming images of the plurality of light beams deflected by said deflection means on a surface to be scanned,
  - wherein said scanning optical means has at least one scanning optical element made of a resin, and said scanning optical element made of the resin has birefringence due to a stress distribution generated upon cooling in a molding process thereof such that the directions of principal axes of birefringence at one end portion of said scanning optical element made of the resin are different from those at the other end portion, opposite to said one end portion with respect to an optical axis thereof in a main scanning direction, of said scanning optical element made of the resin, and
  - wherein an interval between adjacent scanning lines of scanning lines formed on the scanned surface by the plurality of light beams whose images are formed on

the scanned surface through said scanning optical element made of the resin changes in the main scanning direction in an effective scanning region, and

wherein said apparatus comprises at least one setting means for setting an interval error between scanning lines in a sub-scanning line direction, the interval error being caused by a relation in which polarization directions of the light beams emitted from the plurality of light emitting portions are not parallel or orthogonal with each other, to be not more than 1/5 of a desired scanning line interval.

2. to 18. (Cancelled)

19. (Currently Amended) An image forming apparatus comprising:

a multi-beam scanning optical apparatus according to ~~claim 1~~ any one of claims 1, 24, 32, 35, 38, 54, 74, 75, 82, 95 or 120 to 127;

a photosensitive member disposed in the scanned surface;

a developer for developing, as a toner image, an electrostatic latent image formed on said photosensitive member by light beams scanned by said multi-beam scanning optical apparatus;

a transfer device for transferring the developed toner image onto a recording medium; and

a fixing device for fixing the transferred toner image on the recording medium.

20. (Currently Amended) An image forming apparatus comprising:  
said multi-beam scanning optical apparatus of ~~claim 1~~ any one of claims 1, 24, 32, 35, 38, 54, 74, 75, 82, 95 or 120 to 127; and  
a printer controller for converting code data received from an external device into an image signal and inputting the image signal to said scanning optical apparatus.

21. to 23. (Cancelled)

24. (Previously Presented) A multi-beam scanning optical apparatus comprising:  
incident optical means for making a plurality of light beams emitted from light source means having a plurality of light emitting portions incident on deflection means; and  
scanning optical means for forming images of the plurality of light beams deflected by said deflection means on a surface to be scanned,  
wherein said scanning optical means has at least one scanning optical element made of a resin, and said scanning optical element made of the resin has birefringence due to a stress distribution generated upon cooling in a molding process thereof such that the directions of principal axes of birefringence at one end portion of said scanning optical element made of the resin are different from those at the other end portion,

opposite to said one end portion with respect to an optical axis thereof in a main scanning direction, of said scanning optical element made of the resin, and

wherein an interval between adjacent scanning lines of scanning lines formed on the scanned surface by the plurality of light beams whose images are formed on the scanned surface through said scanning optical element made of the resin changes in the main scanning direction in an effective scanning region, and

said apparatus comprises at least one setting means for setting a sub-scanning interval error between the scanning lines due to a polarization angle difference between the light beams emitted from the plurality of light emitting portions to be not more than  $1/5$  of a desired scanning line interval,

said setting means comprising correction means for correcting the polarization angle difference between the plurality of light beams incident on said scanning optical element made of the resin, and

wherein said setting means comprises adjustment means capable of independently adjusting polarization angles of light beams emitted from the plurality of light emitting portions.

25. to 31. (Canceled)

32. (Previously Presented) A multi-beam scanning optical apparatus comprising:

incident optical means for making a plurality of light beams emitted from light source means having a plurality of light emitting portions incident on deflection means; and

scanning optical means for forming images of the plurality of light beams deflected by said deflection means on a surface to be scanned,

wherein said scanning optical means has at least one scanning optical element made of a resin, and said scanning optical element made of the resin has birefringence due to a stress distribution generated upon cooling in a molding process thereof such that the directions of principal axes of birefringence at one end portion of said scanning optical element made of the resin are different from those at the other end portion, opposite to said one end portion with respect to an optical axis thereof in a main scanning direction, of said scanning optical element made of the resin, and

wherein an interval between adjacent scanning lines of scanning lines formed on the scanned surface by the plurality of light beams whose images are formed on the scanned surface through said scanning optical element made of the resin changes in the main scanning direction in an effective scanning region, and

said apparatus comprises at least one setting means for setting an actual sub-scanning interval error between the scanning lines on the scanning surface to be smaller than the sub-scanning interval error between the scanning lines on the scanned surface, caused by a relative displacement in polarization angle between the light beams emitted from the plurality of light emitting portions,

said setting means comprising a scanning optical element made of a resin, which is shift-decentered perpendicularly to a sub scanning direction.

33. and 34. (Cancelled)

35. (Previously Presented) A multi-beam scanning optical apparatus comprising:

incident optical means for making a plurality of light beams emitted from light source means having a plurality of light emitting portions incident on deflection means; and

scanning optical means for forming images of the plurality of light beams deflected by said deflection means on a surface to be scanned,

wherein said scanning optical means has at least one scanning optical element made of a resin, and said scanning optical element made of the resin has birefringence due to a stress distribution generated upon cooling in a molding process thereof such that the directions of principal axes of birefringence at one end portion of said scanning optical element made of the resin are different from those at the other end portion, opposite to said one end portion with respect to an optical axis thereof in a main scanning direction, of said scanning optical element made of the resin, and

wherein an interval between adjacent scanning lines of scanning lines formed on the scanned surface by the plurality of light beams whose images are formed on

the scanned surface through said scanning optical element made of the resin changes in the main scanning direction in an effective scanning region, and

said apparatus comprises at least one setting means for setting an actual sub-scanning interval error between the scanning lines on the scanned surface to be smaller than the sub-scanning interval error between the scanning lines on the scanned surface, caused by a relative displacement in polarization angle between the light beams emitted from the plurality of light emitting portions,

said setting means comprising polarized light limiting means inserted into an optical path between the light source means and said scanning optical element made of the resin.

36. and 37. (Cancelled)

38. (Previously Presented) A multi-beam scanning optical apparatus comprising:

an incident optical system for making a plurality of light beams emitted from a light source having a plurality of light emitting portions incident on a deflector;

a scanning optical system for forming images with the plurality of light beams deflected by the deflector on a surface to be scanned, said scanning optical system having a plurality of scanning optical elements each made of a resin; and

at least one setting means for setting an interval error between scanning lines in a sub-scanning line direction, the interval error being caused by a relation in which

polarization directions of the light beams emitted from the plurality of light emitting portions are not parallel or orthogonal with each other, to be not more than  $1/5$  of a desired scanning line interval.

39. to 53. (Cancelled)

54. (Previously Presented) A multi-beam scanning optical apparatus comprising:

an incident optical system for making a plurality of light beams emitted from a light source having a plurality of light emitting portions incident on a deflector;

a scanning optical system for forming images of the plurality of light beams deflected by the deflector on a surface to be scanned, said scanning optical system having refractive optical elements all of which are scanning optical elements each made of a resin; and

at least one setting means for setting an interval error between scanning lines in a sub-scanning line direction, the interval error being caused by a relation in which polarization directions of the light beams emitted from the plurality of light emitting portions are not parallel or orthogonal with each other, to be not more than  $1/5$  of a desired scanning line interval.

55. to 73. (Cancelled)



74. (Previously Presented) A multi-beam scanning optical apparatus comprising:

incident optical means for making a plurality of light beams emitted from light source means having a plurality of light emitting portions incident on deflection means; and

scanning optical means for forming images of the plurality of light beams deflected by said deflection means on a surface to be scanned,

wherein said scanning optical means has at least one scanning optical element made of a resin, and said scanning optical element made of the resin has birefringence due to a stress distribution generated upon cooling in a molding process thereof such that the directions of principal axes of birefringence at one end portion of said scanning optical element made of the resin are different from those at the other end portion, opposite to said one end portion with respect to an optical axis thereof in a main scanning direction, of said scanning optical element made of the resin, and

wherein an interval between adjacent scanning lines of scanning lines formed on the scanned surface by the plurality of light beams whose images are formed on the scanned surface through said scanning optical element made of the resin changes in the main scanning direction in an effective scanning region, and

said apparatus comprises at least one setting means for setting an actual sub-scanning interval error between the scanning lines on the scanning surface to be smaller than the sub-scanning interval error between the scanning lines on the scanned

surface, caused by a relative displacement in polarization angle between the light beams emitted from the plurality of light emitting portions,

said setting means comprising a scanning optical element made of a resin, which is rotary-decentered about the main scanning direction.

75. (Previously Presented) A multi-beam scanning optical apparatus comprising:

incident optical means for making a plurality of light beams emitted from light source means having a plurality of light emitting portions incident on deflection means; and

scanning optical means for forming images of the plurality of light beams deflected by said deflection means on a surface to be scanned,

wherein said scanning optical means has at least one scanning optical element made of a resin, and said scanning optical element made of the resin has birefringence due to a stress distribution generated upon cooling in a molding process thereof such that the directions of principal axes of birefringence at one end portion of said scanning optical element made of the resin are different from those at the other end portion, opposite to said one end portion with respect to an optical axis thereof in a main scanning direction, of said scanning optical element made of the resin, and

wherein an interval between adjacent scanning lines of scanning lines formed on the scanned surface by the plurality of light beams whose images are formed on

the scanned surface through said scanning optical element made of the resin changes in the main scanning direction in an effective scanning region, and

said apparatus comprises at least one setting means for setting an actual sub-scanning interval error between the scanning lines on the scanning surface to be smaller than the sub-scanning interval error between the scanning lines on the scanned surface, caused by a relative displacement in polarization angle between the light beams emitted from the plurality of light emitting portions,

said setting means comprising a scanning optical element made of a resin, which is shift-decentered perpendicularly to a sub scanning direction and rotary-decentered about the main scanning direction.

76. to 81. (Cancelled)

82. (Previously Presented) A multi-beam scanning optical apparatus comprising:

incident optical means for making a plurality of light beams emitted from light source means having a plurality of light emitting portions incident on deflection means;

scanning optical means for forming images of the plurality of light beams deflected by said deflection means on a surface to be scanned,

wherein said scanning optical means has at least one scanning optical element made of a resin, and

wherein, if h is a sub-scanning width of said scanning optical element made of the resin and d is an optical-axis-direction width,  $h/d \leq 1.8$  is satisfied; and

at least one setting means for setting an interval error between scanning lines in a sub-scanning line direction, the interval error being caused by a relation in which polarization angles of the light beams emitted from the plurality of light emitting portions are not parallel or orthogonal with each other, to be not more than 1/5 of a desired scanning line interval.

83. to 94. (Cancelled)

95. (Previously Presented) A multi-beam scanning optical apparatus comprising:

incident optical means for making a plurality of light beams emitted from light source means having a plurality of light emitting portions incident on deflection means;

scanning optical means for forming images of the plurality of light beams deflected by said deflection means on a surface to be scanned,

wherein said scanning optical means has at least one scanning optical element made of a resin, and

wherein, if h is a sub-scanning width of said scanning optical element made of the resin and t is a sub-scanning width of the light beam passing through said scanning optical element made of the resin,  $h/t \leq 15$  is satisfied; and

at least one setting means for setting an interval error between scanning lines in a sub-scanning line direction, the interval error being caused by a relation in which polarization angles of the light beams emitted from the plurality of light emitting portions are not parallel or orthogonal with each other, to be not more than 1/5 of a desired scanning line interval.

96. to 119. (Cancelled)

Please add Claims 120 to 127, as follows:

120. (New) A multi-beam scanning optical apparatus comprising:  
light source means having a plurality of light emitting portions, the light emitting portions emitting a plurality of light beams whose polarization directions are neither parallel nor orthogonal with each other;  
incident optical means for carrying the plurality of light beams emitted from the light emitting portions of said light source means onto deflection means; and  
scanning optical means for forming images of the plurality of light beams deflected by deflection means on a surface to be scanned,  
wherein said scanning optical means has at least one scanning optical element made of a resin, and

wherein letting  $h$  be a sub-scanning width of the scanning optical element and  $d$  be an optical-axis-direction width of the scanning optical element,  $h/d \leq 1.8$  is satisfied, and

wherein an angle difference of polarized directions of the light beams emitted from said plurality of the light emitting portions of the light source means is equal to or less than 20 degrees to keep an error range of intervals between scanning lines used in forming of the images in a sub-scanning direction within a range not more than  $1/5$  of a desired scanning line interval.

121. (New) A multi-beam scanning optical apparatus comprising:

light source means having a plurality of light emitting portions, the light emitting portions emitting a plurality of light beams whose polarization directions are neither parallel nor orthogonal with each other;

incident optical means for carrying the plurality of light beams emitted from the light emitting portions of said light source means onto deflection means; and

scanning optical means for forming images of the plurality of light beams deflected by deflection means on a surface to be scanned,

wherein said scanning optical means has at least one scanning optical element made of a resin, and

wherein letting  $h$  be a sub-scanning width of the scanning optical element and  $t$  be an sub-scanning width of a light beam passing through the scanning optical element made of the resin,  $h/t \leq 15$  is satisfied; and

wherein an angle difference of polarized directions of the light beams emitted from said plurality of the light emitting portions of the light source means is equal to or less than 20 degrees to keep an error range of intervals between scanning lines used in forming of the images in a sub-scanning direction within a range not more than 1/5 of a desired scanning line interval.

122. (New) A multi-beam scanning optical apparatus comprising:

light source means having a plurality of light emitting portions, the light emitting portions emitting a plurality of light beams whose polarization directions are neither parallel nor orthogonal with each other;

incident optical means for carrying the plurality of light beams emitted from the light emitting portions of said light source means onto deflection means; and

scanning optical means having a plurality of scanning optical elements, for forming images of the plurality of light beams deflected by deflection means on a surface to be scanned, each of the scanning optical means being made of a resin,

wherein an angle difference of polarized directions of the light beams emitted from said plurality of the light emitting portions of the light source means is equal to or less than 20 degrees to keep an error range of intervals between scanning lines used in forming of the images in a sub-scanning direction within a range not more than 1/5 of a desired scanning line interval.

123. (New) A multi-beam scanning optical apparatus comprising:

light source means having a plurality of light emitting portions, the light emitting portions emitting a plurality of light beams whose polarization directions are neither parallel nor orthogonal with each other;

incident optical means for carrying the plurality of light beams emitted from the light emitting portions of said light source means onto deflection means; and

scanning optical means having a plurality of refractive scanning optical elements made of a resin, for forming images of the plurality of light beams deflected by deflection means on a surface to be scanned,

wherein an angle difference of polarized directions of the light beams emitted from said plurality of the light emitting portions of the light source means is equal to or less than 20 degrees to keep an error range of intervals between scanning lines used in forming of the images in a sub-scanning direction within a range not more than 1/5 of a desired scanning line interval.

124. (New) A multi-beam scanning optical apparatus comprising:

light source means having a plurality of light emitting portions, the light emitting portions emitting a plurality of light beams whose polarization directions are neither parallel nor orthogonal with each other;

incident optical means for carrying the plurality of light beams emitted from the light emitting portions of said light source means onto deflection means; and

scanning optical means for forming images of the plurality of light beams deflected by deflection means on a surface to be scanned,



wherein said scanning optical means has at least one scanning optical element made of a resin, and

wherein said scanning optical element is shift-decentered perpendicularly to a sub-scanning direction to keep an error range of intervals between scanning lines used in forming of the images in the sub-scanning direction within a range not more than  $1/5$  of a desired scanning line interval.

125. (New) A multi-beam scanning optical apparatus comprising:

light source means having a plurality of light emitting portions, the light emitting portions emitting a plurality of light beams whose polarization directions are neither parallel nor orthogonal with each other;

incident optical means for carrying the plurality of light beams emitted from the light emitting portions of said light source means onto deflection means; and

scanning optical means for forming images of the plurality of light beams deflected by deflection means on a surface to be scanned,

wherein said scanning optical means has at least one scanning optical element made of a resin, and

wherein said scanning optical element is rotary-decentered about a main scanning direction to keep an error range of intervals between scanning lines used in forming of the images in a sub-scanning direction within a range not more than  $1/5$  of a desired scanning line interval.

126. (New) A multi-beam scanning optical apparatus comprising:

light source means having a plurality of light emitting portions, the light emitting portions emitting a plurality of light beams whose polarization directions are neither parallel nor orthogonal with each other;

incident optical means for carrying the plurality of light beams emitted from the light emitting portions of said light source means onto deflection means; and

scanning optical means for forming images of the plurality of light beams deflected by deflection means on a surface to be scanned, said scanning optical means having at least one scanning optical element made of a resin; and

polarized light limiting means inserted into an optical path between said light source means and the scanning optical element.

127. (New) A multi-beam scanning optical apparatus comprising:

light source means having a plurality of light emitting portions to emit a plurality of light beams;

incident optical means for carrying the plurality of light beams emitted from the light emitting portions of said light source means onto deflection means; and

scanning optical means for forming images of the plurality of light beams deflected by deflection means on a surface to be scanned, said scanning optical means having at least one scanning optical element made of a resin; and

adjustment means for independently adjusting polarization directions of the light beam emitted from the plurality of light emitting portions.